Bay Linear

Linear Excellence

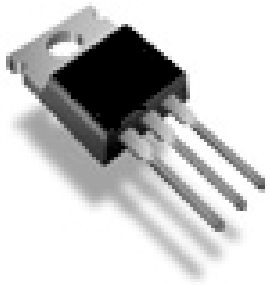
POWER MOSFET **IRF540**

Advance Information

Description

The Bay Linear MOSFET's provide the designers with the best combination of fast switching, ruggedized device design, low 0n-resistance and low cost-effectiveness.

The TO-220 is offered in a 3-pin is universally preferred for all commercial-industrial applications at power dissipation level to approximately to 50 Watts. Also, available in a D^2 surface mount power package with a power dissipation up to 2 Watts.



Features

- **Dynamic dv/dt Rating**
- **Repetitive Avalanche Rated**
- **Fast Switching**
- **Ease of Paralleling**
- **Simple Drive Requirements**

V_{DSS} = 100V
$R_{DS\ (ON)}$ = 0.077 Ω
I_D =28A

Ordering Information

Device	Package	Temp.
IRL540T	TO-220	0 to 150°C
IRL540S	TO-263 (D^2)	0 to 150°C

Absolute Maximum Rating

	Parameter	Max	Unit
I_D@ T_C =25°C	Continuous Drain Current, $V_{GS\ @10}$V	28	**A**
I_D@ T_C =100°C	Continuous Drain Current, $V_{GS\ @10}$V	20	
I_{DM}	Pulsed Drain Current	110	
P_D @ T_C =25°C	Power Dissipation	150	**W**
P_D @ T_A =25°C	Power Dissipation (PCB Mount, D^2) (1)	3.7	
	Linear Derating Factor	1.0	**W/°C**
	Linear Derating Factor (PCB Mount, D^2) (1)	0.025	
V_{GS}	Gate-to- Source Voltage (TO-220)	±20	**V**
V_{GS}	Gate-to- Source Voltage (D^2)	±10	
E_{AS}	Single Pulse Avalanche Energy (TO-220) (2a)	230	**mJ**
E_{AS}	Single Pulse Avalanche Energy (D2) (2b)	440	
I_{AR}	Avalanche Current	28	**A**
E_{AR}	Repetitive Avalanche Energy	15	**mJ**
dv/dt	Peak Diode Recovery dv/dt	5.5	**V/ns**
T_J, T_{STG}	Junction & Storage Temperature Range	–55 to +175	**°C**
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Min	Typ	Max	Units
$R_{\theta JC}$	Junction-to Case	-	-	1.0	**°C/W**
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface (TO-220)		0.50		
$R_{\theta JA}$	Junction-to Ambient (PCB Mount, D^2)	-	-	40	
$R_{\theta JA}$	Junction-to Ambient	-	-	62	

Electrical Characteristics (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{(BR)DSS}$	Drain-to-source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	100			V
$V_{(BR)DSS}$ / ΔT_J	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D = 1mA	-	0.13	-	V/°C
$I_{D(ON)}$	On-State Drain Current (note 2)	$V_{GS} > I_{D(ON)}$ x $R_{DS(ON)}$Max			28	A
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	TO-220: V_{GS} = 10V, I_D = 17A D^2: V_{GS} = 5V, I_D = 17A (note 4)			0.077	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	-	-	V
g_{fs}	Forward Transconductance	V_{DS} = 50V, I_D = 17A	8.7	-	-	S
I_{DSS}	Drain-to –Source Leakage Current	V_{DS}=100V,V_{GS}=0V	-	-	25	μA
		V_{DS}=80V,V_{GS}=0V,T_J=150°C			250	
I_{GSS}	Gate-to-Source Forward Leakage	V_{GS} = 20V	-	-	100	nA
	Gate-to-Source Reverse Leakage	V_{GS} = -20V			-100	
Q_G	Total Gate Charge	I_D=17V	-	-	72	nC
Q_{gs}	Gate- to -Source Charge	V_{DS}=80V	-	-	11	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=50V	-	11	-	ns
t_f	Fall Time	R_D=2.9	-	43	-	
$t_{d(off)}$	Turn -Off Delay Time	R_G=9.1Ω	-	53	-	
t_r	Rise Time	I_D=17A	-	44	-	
L_D	Internal Drain Inductance	Between lead 6mm(0.25in.) from package and center or die contact	-	4.5	-	nH
L_S	Internal Source Inductance		-	7.5	-	
C_{iss}	Input Capacitance	V_{GS}=0V	-	1700	-	pF
C_{OSS}	Output Capacitance	V_{DS}=25V	-	560	-	
C_{rss}	Reverse Transfer Capacitance	F =1.0MHZ	-	120	-	

Source-Drain Rating Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
I_S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	28	A
I_{SM}	Pulsed Source Current (Body Diode)		-	-	110	
V_{SD}	Diode Forward Voltage	T_J=25°C, I_S=28A,V_{GS}=DV	-	-	2.5	V
t_{rr}	Reverse Recovery Time	T_J=25°C, I_F=17A	-	180	360	ns
Q_{rr}	Reverse Recovery Charge	di/dt=100A/μs	-	1.3	2.8	μC
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by (L_S+L_D)				

Notes: 1. Repetitive Rating; pulse width limited by max. junction temperature.
2a. V_{DD} = 25V, starting Tj = 25°C, L = 440μH R_G = 25Ω, I_{AS} = 28A
2b. V_{DD} = 25V, starting Tj = 25°C, L = 841μH R_G = 25Ω, I_{AS} = 28A
3. I_{SD} ≤ 28A, di/dt ≤ 170A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C
4. Pulse with ≤ 300μs; duty cycle ≤ 2%

Advance Information- These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

Preliminary Information- These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

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